

Lowell Regional Wastewater 451 First Street Boulevard Lowell, MA 01854 Attn: Tom Kawa

4/24/2017

Dear Mr. Kawa,

Enclosed please find the toxicological evaluation and chemical analyses report for the effluent received on March 27, 2017. This is your 2017 Stormwater bioassay report. Please call me at (401) 353-3420 if you have any questions.

Sincerely,

Michael McCallum Technical Laboratory Director

NEW ENGLAND TESTING LABORATORY, INC.

59 Greenhill St., West Warwick, RI 02893 (401) 353-3420 TOXICOLOGICAL EVALUATION AND CHEMICAL ANALYSES OF EFFLUENT: NPDES Permit # MA0100633 Stormwater 2017 Sample

> Prepared For: Lowell Regional Wastewater 451 First Street Boulevard Lowell, MA 01854

> > April 24, 2017

By New England Testing Laboratory, Inc. 59 Greenhill Street West Warwick, RI 02893

NETLAB CASE NUMBER: D0327-30



GEOTECHNICAL

ENVIRONMENTA

ECOLOGICAL

WATER

CONSTRUCTION MANAGEMENT

77 Batson Drive Manchester, CT 06042 T: 860.643.9560 F: 860.646.7169 www.nebio.com



ACUTE AQUATIC TOXICITY TEST REPORT

Lowell Regional Wastewater Utilities Lowell, Massachusetts NPDES Permit: MA0100633

Test Start Date:	3/28/17	_
Test Period:	March 2017	

Report Prepared by:

New England Bioassay A Division of GZA GeoEnvironmental, Inc. 77 Batson Drive Manchester, CT 06042

NEB Project Number: 05.0044476.00

Report Date: April 21, 2017

Report Submitted to:

New England Testing Laboratories 59 Greenhill Street West Warwick, RI02893

Sample ID: Stormwater

Please contact the Lab Manager, Kim Wills, at (860) 858-3153 or kimberly.wills@gza.com if you have any questions concerning these results.

Page 1 of 6

Whole Effluent Toxicity Testing Report Instruction Form

Client Name/Project: <u>NET/Lowell</u>	Test Date:	3/28/17
Sample ID: Stormwater		
Your results were as follows:		
Pass		
☐ Fail – Please proceed according to the instructions	s in your permit.	
□ Invalid – Retesting is still required. Retest repo	ort will be sent at	a later date under separate cover.
□ Original Test Invalid – Valid retest performed.	Both test and ret	est results are attached.
☐ Retesting will be or has been performed according of EPA-New England's species-specific, self-imp	•	
This is your case of dilution water Protocols outlined in the attached copy of EP policy for alternate dilution water. The alternate should be described as follows: "synthetic labor protocols, by adding specified amounts of salts intreceiving water." Writing this letter should help y	A-New England' dilution water you ratory water mad to deionized water	s species-specific, self-implementing u select for future tests for this species e up according to EPA's toxicity test r in order to match the hardness of our
☐ Available information is insufficient to determine very to your permit limits. Please submit a current copy the status of future tests results and help ensure you	of your permit to	the NEB Lab so that we can determine

Please complete the items on this list before reporting these results according to the instructions in the "Monitoring and Reporting" Section of your permit.

- Please complete, sign and date the upper portion of the "Whole Effluent Toxicity Test Report Certification" page which is the page directly following this page.
- Fill in the Sample Type and Sample Method (upper right) and the Permit Limits (lower left) on the New England Bioassay, Inc.-EPA Toxicity Test Summary Sheet(s) if they are incomplete.
- Fill in any missing information on the NEB Chain-of-Custody documents. This includes ensuring
 that the following information is recorded: Sampler's name and title, Facility name and address,
 Sample collection methods, Sample collection start and end dates and times, Types of sample,
 Chlorination status of samples upon shipment to NEB, Site description and Sample collection
 procedures.
- Monitoring results should be summarized on your monthly Discharge Monitoring Report Form.
- Signed and dated originals of this report must be submitted to the State (and Federal) Agencies specified in the "Monitoring and Reporting" section of your permit.

Questions? Please contact the Lab Manager, Kim Wills, at (860) 643-9560 or kimberly.wills@gza.com.

WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION (Permittee)

I certify under penalty of law that this document and all ATTACHMENTS were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on		
	[Date]	[Authorized Signature]
		[Print or Type Name and Title]
		[Print or Type the Permittee's Name]
		[Print or Type the NPDES Permit No.]

Since the WET test and report check is complicated, the New England Bioassay Aquatic Toxicity Laboratory has certified the validity of the WET test data in the section below. Please note that this does not relieve the permittee from its responsibility to sign and certify the report under 40 C.F.R. S 122.41(k).

WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION (Bioassay Laboratory)

I certify under penalty of law that this document and all ATTACHMENTS were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on

[Date]

[Authorized Signature]

Kim Wills, Laboratory Manager

[Print or Type Name and Title]

New England Bioassay

[Print or Type Name of Bioassay Laboratory]

24. Telephone Contacts

If you have questions, please contact Joy Hilton, Water Technical Unit, at (617) 918-1877 or David McDonald, Ecosystem Assessment Unit, at (617) 918-8609.

NEW ENGLAND BIOASSAY, A DIVISION OF GZA EPA TEST SUMMARY SHEET

Facility Name: Lowe	<u>II RWWU</u>		_ Test Start Date:	3/28/17
NPDES Permit Number		0633	Outfall Number:	
Test Type	Test Species		nple Type	Sample Method
XAcute	Fathead Minn		rechlorinated	XGrab
Chronic	XCeriodaphnia	XD	echlorinated	_ Composite
Modified	Daphnia Pule		hlorine Spiked in Lab	Flowthru
(chronic reporting	Mysid Shrim		hlorinated on site	Other
acute values)	_ Sheepshead		nchlorinated	
24hr screening	Menidia			
_2 //// 50/00////5	Sea Urchin			
	Champia			
	Selenastrum			
Dilution Water	= Scienastrum			
	ected at a point ur	ostream of or aw	ay from the discharge,	free from toxicity
	es of contamination		-	
			ess, etc. to generally ref	
	of the receiving v)
			Q or equivalent deioniz	red water and
			nbined with mineral wa	
or artificial sea salts			nomea with mineral w	,
_ deionized water and				
other		, 01		
- omei				
Effluent sampling date	(s):3/27/17	-		
Effluent concentration	a tagtad (im0/).	0 605 105 0	5 50 100	
Effluent concentrations			3 30 100	
* Permit limit	concentration:	<u>≥ 100%</u>		
Was effluent salinity as With sea salts? N/A Actual effluent concen	Hypersaline bri	ne solution? 1	<u> </u>	5 <u>25</u> <u>50</u> <u>100</u>
Reference Toxicant tes	st date: 3/1/17		=	
	33			
	Test	Acceptability (Criteria	
Mean Control Survival	I· N/A	Mean	Control Reproduction:	N/A
Mean Diluent Survival			Diluent Reproduction:	
Mean Control Weight:			Control Cell Count:	
Mean Diluent Weight:			Diluent Cell Count:	
Wedn Diluent Weight.		_ ivican	Directi Con Count.	14/11
Limits			Results	
LC50 ≥ 1009		LC50	>100%	
	, 0	Upper Value	±∞	
		Lower Value	100%	
		Data Analysis		
		Method Used	Graphical	
A-NOEC N/A		A-NOEC	100%	
A-NOEC N/A C-NOEC N/A		C-NOEC	10070	
C-NOEC N/A		LOEC		
IC25 N/A		IC25		
		IC50	-	
IC50 <u>N/A</u>		IC30	8	

CERIODAPHNIA DUBIA AQUATIC TOXICITY TEST REPORT EPA 821-R-02-012, "Methods for Measuring the Acute Toxicity of **Test Reference Manual:** Effluents and Receiving Waters to Freshwater Organisms and Marine Organisms", Fifth Edition **Test Method:** Ceriodaphnia dubia Acute Toxicity Test – Method 2002.0 Test Type: Acute Static Non-Renewal Freshwater Test 25 ± 1 °C Temperature: **Ambient Laboratory Illumination** Light Quality: 16 hours light, 8 hours dark Photoperiod: **Test Chamber Size:** 30 mL **Test Solution Volume:** Minimum 25 mL Age of Test Organisms: 1-24 hours (neonates) Number of Daphnids 5 Per Test Chamber: Number of Replicate Test **Chambers Per Treatment: 4 Total Number of Daphnids Per Test Concentration:** 20 Fed YCT and Selanastrum while holding prior to initiating test as Feeding Regime: per manual. **Aeration:** None NEB Lab Synthetic Soft Water (hardness 40 to 48 mg/L) **Dilution Water:** 0%, 6.25%, 12.5%, 25%, 50% and 100% effluent **Effluent Concentrations:** 48 hours **Test Duration:** Mortality – no movement of body/appendages on gentle prodding. **Effect measured:** Test Acceptability: \geq 90% survival of test organisms in control solution Yes X No _

Sampling Requirements: Samples first used within 36 hours of collection Yes X No

Sample Volume Required: Minimum 1 liter

Test Organism Source: **NEB**

Test Acceptability Criteria: Mean Alternate Water Control Survival = N/A

Mean Dilution Water Control Survival = ___100%__

<u> Γest Results:</u>		Limits	Results	Status
	48-hour LC50 Upper Value Lower Value Data Analysis Method Use A-NOEC	≥ 100% ed	>100% ±∞ 100% Graphica 100%	Pass X Fail_
Reference Toxicant Data:	Date: Toxicant: Dilution Water: Source: 48-hour LC50: In Acceptable Range	Sodium NEB L New E	17 a Chloride ab Synthetic ngland Bioas 0 g/L No	say
Dechlorination Procedures	: Chlorine is measured usin	ng 4500 CL-C	DPD Color	imetric Method.
X Dechlorination was not red	quired			
Sample was dechlorinated because the sample was dechlorination of the ewith sodium thiosulfate was dechlorinated sample.	ffluent was necessary, a thi	osulfate contr	ol of diluent	water spiked
Chlorine Measurement was filtered sample.	elevated due to interference	e. Chlorine w	/as	mg/L in a
Total Residual Chlorine wa	s re-measured following ae	ration, and wa	as found to b	e mg/L.
Additional Notes or Other	Conditions Affecting the	<u>Γest</u> :		
				=======================================
				±2

NEW ENGLAND BIOASSAY ACUTE TOXICITY DATA FORM COVER SHEET FOR LC50 TESTS

CLIENT:	New England Testing Laboratory		C.dubia TEST ID#	17-413
ADDRESS:	59 Greenhill Street		COC#	c37-1692
	West Warwick, RI 02893		PROJECT#	05.0044476.00
SAMPLE TYPE:	Lowell RWU Stormwater			
DILUTION WATER:	Soft Reconstituted Freshwater			
Sample Date(s):	3/27/17	Date Received:	3/27	7/17
	<u>11</u>	NVERTEBRATES		
	TEST SET UP (TECH INIT)	CW		
	TEST SPECIES	Ceriodaphnia dubia		
	NEB LOT#	Cd17(3-28)		
	AGE	< 24 hours		
	TEST SOLUTION VOLUME (mls)	30	•	
NO. OF	RGANISMS PER TEST CHAMBER	5		
	GANISMS PER CONCENTRATION	20		
	NO. ORGANISMS PER CONTROL	20		
LABORATORY CONTI	ROL WATER:		Hardness mg/L CaCO ₃	Alkalinity mg/L CaCO ₃
ARTIFICIA	AL FW: NEB BATCH #	C37-S005	48	30
	1,22 2	DATE	TIME	
	TEST START:	3/28/17	1205	
	TEST END:	3/30/17	1105	ā.
	RESULTS OF	Ceriodaphnia dubia	LC50 TEST	
			050/ G 51	
	METHOD	1.050 (0/)	95% Confidence	
	METHOD	LC50 (%)	Limits	
	Ì			ĺ
	BINOMIAL/GRAPHICAL	>100%	100%±∞	
	PROBIT			
	PROBIT			
	SPEARMAN KARBER			
	NOAEL	100%		
	1101 KAD	10070		ļ.
NOEC: NO OBSERV	ABLE EFFECT CONCENTRAT	ION		
Comments:				
-			1	
REVIEWD BY:		1/1	DATE:	4/2/17
				[1 . 1

NEW ENGLAND BIOASSAY Toxicity Test Data Sheet

NEB Test #:	17-413	Test Organism:	Ceriod	aphnia dubia	3
Project #:	05.0044476.00	Organism Age:	<	24 hours	
Facility Name:	Lowell RWU Stormwater	Test Duration:	48	(hours)	
Date Sampled:	3/27/17	Beginning Date:	3/28/17	Time:	1205
Date Received:	3/27/17	Dilution Water So	ource:	SRCF	
Sample ID:	Stormwater	Dilution Hardness:	48	nnm as (CaCO。

Effluent Conc. %	Number of Surviving Organisms		Dissolved Oxygen (mg/L)		Te	emperatu (°C)	ıre		рН			
Initials	CW	СВ	КО	CW	СВ	KO	CW	СВ	КО	CW	СВ	ко
	0	24	48	0	24	48	0	24	48	0	24	48
Diluent A	5	5	5	7.1	8.1	8.5	24.6	25.5	24.0	7.2	7.6	7.5
Diluent B	5	5	5			8.5			24.2			7.5
Diluent C	5	5	5			8.4			24.3			7.6
Diluent D	5	5	5			8.4			24.5			7.6
6.25 A	5	5	5	7.1	7.9	8.4	24.3	25.7	24.5	7.4	7.5	7.5
6.25 B	5	5	5			8.4			24.5			7.6
6.25 C	5	5	5			8.4			24.6			7.6
6.25 D	5	5	5			8.3			24.6			7.6
12.5 A	5	5	5	7.1	7.8	8.3	24.2	25.6	24.6	7.5	7.6	7.6
12.5 B	5	5	5			8.3			24.6			7.6
12.5 C	5	5	5			8.3			24.7			7.7
12.5 D	5	5	5			8.2			24.8			7.7
25 A	5	5	5	7.1	7.6	8.2	24.5	25.7	24.8	7.6	7.6	7.7
25 B	5	5	5			8.2			24.7			7.7
25 C	5	5	5			8.1			24.7			7.7
25 D	5	5	5			8.1			24.7			7.8
50 A	5	5	5	6.9	7.1	8.1	24.4	25.8	24.7	7.5	7.7	7.8
50 B	5	5	5			7.9			24.7			7.8
50 C	5	5	5			7.9			24.7			7.8
50 D	5	5	5			7.9			24.7			7.9

LC50	Confidence Interval	A-NOEC	Computational Method	
>100%	100%±∞	100%	Graphical	

NEW ENGLAND BIOASSAY Toxicity Test Data Sheet

NEB Test #:	17-413	Test Organism:	Ceriodaphnia dubia		
Project #:	05.0044476.00	Organism Age:	<	24 hours	
Facility Name:	Lowell RWU Stormwater	Test Duration:	48	(hours)	
Date Sampled:	3/27/17	Beginning Date:	3/28/17	Time:120	5
Date Received:	3/27/17	Dilution Water So	urce:	SRCF	
Sample ID:	Stormwater	Dilution Hardness:	48	ppm as CaCO ₃	J

Effluent Conc. %	:	lumber o Survivino Organism	9		Dissolved Oxygen (mg/L)		Te	emperatu (°C)	ire		рН	
Initials	CW	СВ	KO	CW	СВ	KO	CW	СВ	KO	CW	CB	KO
	0	24	48	0	24	48	0	24	48	0	24	48
100 A	5	5	5	6.9	6.3	7.7	24.5	25.8	24.6	7.5	7.8	7.9
100 B	5	5	5			7.5			24.7			7.9
100 C	5	5	5			7.5			24.7			7.9
100 D	5	5	5			7.5			24.7			8.0
					_							
					_							

LC50	Confidence Interval	A-NOEC	Computational Method
>100%	100%±∞	100%	Graphical

Report Date:

21 Apr-17 11:06 (p 1 of 2)

Test Code: 17-413 | 09-6938-3753

Ceriod	aphnia	48-h Acute Surv	vival Test								Ne	w Englan	d Bioass
Analysi		12-7868-6810		point:	48h Survival Ra				TIS Versi		TISv1.	9.2	
nalyz	ed:	21 Apr-17 11:06	6 Ana	lysis:	Linear Interpola	ation (ICPIN)	Off	ficial Res	ults: Ye	S		
Batch I	D:	11-9877-1193	Test	Type:	Survival (48h)			An	alyst:				
Start D	ate:	28 Mar-17 12:05	Prot	ocol:	EPA/821/R-02-	012 (2002)		Dil	uent:	Laborator	y Wate	er	
Ending	Date:	30 Mar-17 11:05	Spe	cies:	Ceriodaphnia d	lubia		Bri	ine:	Not Applic	able		
Duratio	n:	47h	Sou	rce:	In-House Cultu	re		Ag	e:	<24h			
Sample		11-2351-3758	Cod	e:	42F7759E			Cli	ent:	New Engl	and Te	sting Labs	i
-		27 Mar-17 11:00		erial:	WWTF Effluen			Pro	oject:				
-		27 Mar-17 16:15			Lowell RWWU	(MA010063	3)						
Sample	Age:	25h	Stat	ion:									
Linear	Interpo	lation Options											
X Trans	sform	Y Transform			Resamples	Exp 95%		thod					
Log(X)		Linear	9382	231	200	Yes	Tw	o-Point Inte	rpolation				
Test Ac	ceptat	oility Criteria	TAC L	imits									
Attribu	te	Test Stat	Lower	Upper		Decision							
Control	Resp	1	0.9	>>	Yes	Passes C	riteria						
Point E	stimat	es											
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL							
LC50	>100	n/a	n/a	<1	n/a	n/a							
48h Su	rvival f	Rate Summary				Calcu	lated Var	riate(A/B)					
Conc-%	ó	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Ef	fect	Α	В
0		D	4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	6 0.09	6	20	20
6.25			4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	6 0.09	6	20	20
12.5			4	1.0000		1.0000	0.0000	0.0000	0.00%			20	20
25			4	1.0000		1.0000	0.0000	0.0000	0.00%			20	20
50			4	1.0000		1.0000	0.0000	0.0000	0.00%			20	20
100			4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	6 0.0%	<u> </u>	20	20
48h Su	rvival F	Rate Detail											
Conc-%	6	Code	Rep 1	Rep 2	Rep 3	Rep 4							
0		D	1.0000	1.0000	1.0000	1.0000							
6.25			1.0000	1.0000		1.0000							
12.5			1.0000	1.0000		1.0000							
25			1.0000	1.0000		1.0000							
50			1.0000	1.0000	1.0000	1.0000							
100			1.0000	1.0000	1.0000	1.0000							
48h Su	rvival F	Rate Binomials											
	, D	Code	Rep 1	Rep 2	Rep 3	Rep 4							
		D	5/5	5/5	5/5	5/5							
			5/5	5/5	5/5	5/5							
0			5/5										
0 6.25			5/5	5/5	5/5	5/5							
0 6.25 12.5					5/5 5/5	5/5 5/5							
Conc-% 0 6.25 12.5 25 50			5/5	5/5									

Report Date:

21 Apr-17 11:06 (p 2 of 2)

Test Code:

17-413 | 09-6938-3753

Ceriodaphnia 48-h Acute Survival Test

New England Bioassay

Analysis ID: Analyzed:

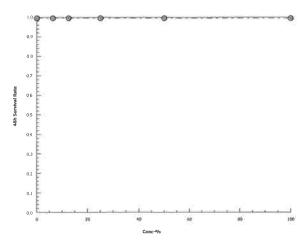
12-7868-6810 21 Apr-17 11:06 Endpoint: 48h Survival Rate Analysis:

Linear Interpolation (ICPIN)

CETIS Version: Official Results:

CETISv1.9.2 Yes

Graphics



Report Date:

21 Apr-17 11:06 (p 1 of 2)

 Api-ii	11.0	O (P	٠.	01	-,
17-413	1 09	-693	8-	37	53

										Test	t Code:			17-413 0	9-6938-3753
Ceriodaphnia	a 48-h A	Acute Surv	vival Te	st									Ne	w Englan	d Bioassay
Analysis ID:	15-08	851-5314	1	Endpoint:	48h	Survival Ra	ate			CET	IS Vers	ion:	CETISv1.	9.2	
Analyzed:	21 A	pr-17 11:06	5 <i>i</i>	Analysis:	Nonp	parametric-	-Control	vs T	reatments	Offi	cial Res	ults:	Yes		
Batch ID:	11-98	77-1193		Test Type:	Surv	ival (48h)				Ana	lyst:				
Start Date:	28 Ma	ar-17 12:05		Protocol:		/821/R-02-	012 (200)2)		Dilu	-	Labo	ratory Wate	er	
Ending Date:	: 30 Ma	ar-17 11:05	:	Species:		odaphnia d	•	,		Brin	ie:		Applicable		
Duration:	47h			Source:		ouse Cultu				Age	:	<24h			
Sample ID:	11-23	51-3758		Code:	42F7	759E				Clie	nt:	New	England Te	sting Labs	3
Sample Date:	: 27 Ma	ar-17 11:00		Material:	ww	TF Effluent	t			Proj	ect:		Ū	Ū	
Receipt Date:				Source:	Lowe	ell RWWU	(MA010	0633	3)	•					
Sample Age:				Station:			`		•						
Data Transfo	rm		Alt Hy	/p						NOEL	LOEI	L	TOEL	TU	
Angular (Corre			C > T	/P						100	> 100		n/a	1	
Steel Many-O	ne Rar	nk Sum Te	st	-											
	vs	Conc-%		Test S	Stat	Critical	Ties	DF	P-Type	P-Value	Decis	sion(c	x:5%)		
Dilution Water	r	6.25		18		10	1	6	Asymp	0.8333			cant Effect		
		12.5		18		10	1	6	Asymp	0.8333	Non-	Signifi	cant Effect		
		25		18		10	1	6	Asymp	0.8333		-	cant Effect		
		50		18		10	1	6	Asymp	0.8333		_	cant Effect		
		100		18		10	1	6	Asymp	0.8333		_	cant Effect		
Test Accepta	bility C	riteria	ТА	C Limits											
Attribute			1/1	O LIIIIIG											
ALL IVULE		Test Stat	Lower	r Upper	_	Overlap	Decisi	ion							
		Test Stat	0.9	Upper		Overlap Yes	Decisi Passe		iteria						
Control Resp ANOVA Table									iteria						
Control Resp	9		0.9			Yes			iteria F Stat	P-Value	Decis	sion(c	1:5%)		
Control Resp ANOVA Table	e	1	0.9	>>		Yes	Passe		=	P-Value <1.0E-37			1:5%) Effect		
Control Resp ANOVA Table Source Between	Đ	1 Sum Squa	0.9	>> Mean		Yes	Passe DF		F Stat						
Control Resp ANOVA Table Source Between Error	e	1 Sum Squa	0.9	>> Mean 0		Yes	Passe DF 5		F Stat						
Control Resp ANOVA Table Source Between Error Total	e	5um Squa 0 0 0	0.9	>> Mean		Yes	DF 5 18		F Stat						
Control Resp ANOVA Table Source Between Error Total 48h Survival	e Rate S	5um Squa 0 0 0	0.9	>> Mean 0 0	Squa	Yes	DF 5 18 23	s Cr	F Stat 65540					CV%	%Effect
Control Resp ANOVA Table Source Between Error Total 48h Survival Conc-%	e Rate S	Sum Squa 0 0 0 ummary	0.9	Mean 0 0 1.0000	Squa	Yes 95% LCL 1.0000	DF 5 18 23 95% U 1.0000	S Cr	F Stat 65540 Median 1,0000	<1.0E-37 Min 1.0000	Max	ficant	Std Err	0.00%	0.00%
Control Resp ANOVA Table Source Between Error Total 48h Survival Conc-%	e Rate S	Sum Squa 0 0 0 ummary Code	0.9 ires	Mean 0 0	Squa	Yes are	DF 5 18 23	S Cr	F Stat 65540 Median	<1.0E-37	Signi Max	ficant	Effect Std Err		
Control Resp ANOVA Table Source Between Error Total 48h Survival Conc-% 0 6.25	e Rate S	Sum Squa 0 0 0 ummary Code	0.9 ires	Mean 0 0 1.0000	Squa	Yes 95% LCL 1.0000	DF 5 18 23 95% U 1.0000	CL	F Stat 65540 Median 1,0000	<1.0E-37 Min 1.0000	Max	ficant	Std Err	0.00%	0.00%
Control Resp ANOVA Table Source Between Error Total 48h Survival Conc-% 0 6.25 12.5	e Rate S	Sum Squa 0 0 0 ummary Code	Count 4	Mean 0 0 1.0000	Squa	Yes 95% LCL 1.0000 1.0000	DF 5 18 23 95% U 1.0000 1.0000	CL	F Stat 65540 Median 1,0000 1,0000	<1.0E-37 Min 1.0000 1.0000	Max 1.000	00 00 00	Std Err 0.0000 0.0000	0.00% 0.00%	0.00% 0.00%
Control Resp ANOVA Table Source Between Error Total 48h Survival Conc-% 0 6.25 12,5 25	e Rate S	Sum Squa 0 0 0 ummary Code	Count 4 4 4	Mean 0 0 1.0000 1.0000	Squa	95% LCL 1.0000 1.0000	DF 5 18 23 95% U 1.0000 1.0000 1.0000	CL	F Stat 65540 Median 1.0000 1.0000 1.0000	<1.0E-37 Min 1.0000 1.0000 1.0000	Max 1.000 1.000	00 00 00 00	Std Err 0.0000 0.0000 0.0000	0.00% 0.00% 0.00%	0.00% 0.00% 0.00%
Control Resp ANOVA Table Source	e Rate S	Sum Squa 0 0 0 ummary Code	0.9 Count 4 4 4 4 4	Mean 0 0 1.0000 1.0000 1.0000	Squa	95% LCL 1.0000 1.0000 1.0000	Passe DF 5 18 23 95% U 1.0000 1.0000 1.0000 1.0000	CL	F Stat 65540 Median 1.0000 1.0000 1.0000 1.0000	Min 1,0000 1,0000 1,0000 1,0000	Max 1.000 1.000 1.000	00 00 00 00 00	Std Err 0.0000 0.0000 0.0000 0.0000	0.00% 0.00% 0.00% 0.00%	0.00% 0.00% 0.00% 0.00%
Control Resp ANOVA Table Source Between Error Total 48h Survival Conc-% 0 6.25 12.5 25 50 100	Rate S	Sum Squa 0 0 0 ummary Code	0.9 Count 4 4 4 4 4 4 4 4 4 4	Mean 0 0 1.0000 1.0000 1.0000 1.0000	Squa	95% LCL 1.0000 1.0000 1.0000 1.0000 1.0000	Passe DF 5 18 23 95% U 1.0000 1.0000 1.0000 1.0000 1.0000	CL	F Stat 65540 Median 1.0000 1.0000 1.0000 1.0000 1.0000	<1.0E-37 Min 1,0000 1.0000 1.0000 1.0000 1.0000	Max 1.000 1.000 1.000 1.000	00 00 00 00 00	Std Err 0,0000 0.0000 0.0000 0.0000 0.0000	0.00% 0.00% 0.00% 0.00% 0.00%	0.00% 0.00% 0.00% 0.00% 0.00%
Control Resp ANOVA Table Source Between Error Total 48h Survival Conc-% 0 6.25 12.5 25 50 100 Angular (Core	Rate S	Sum Squa 0 0 0 ummary Code	0.9 Count 4 4 4 4 4 4 4 4 4 4	Mean 0 0 1.0000 1.0000 1.0000 1.0000 mmary	Squa	95% LCL 1.0000 1.0000 1.0000 1.0000 1.0000	Passe DF 5 18 23 95% U 1.0000 1.0000 1.0000 1.0000 1.0000	CL	F Stat 65540 Median 1.0000 1.0000 1.0000 1.0000 1.0000	<1.0E-37 Min 1,0000 1.0000 1.0000 1.0000 1.0000	Max 1.000 1.000 1.000 1.000	00 00 00 00 00	Std Err 0,0000 0.0000 0.0000 0.0000 0.0000	0.00% 0.00% 0.00% 0.00% 0.00%	0.00% 0.00% 0.00% 0.00% 0.00%
Control Resp ANOVA Table Source Between Error Total 48h Survival Conc-% 0 6.25 12.5 25 50 100 Angular (Core	Rate S	Sum Squa 0 0 0 ummary Code D	Count 4 4 4 4 4 ned Su	Mean 0 0 1.0000 1.0000 1.0000 1.0000 mmary	Squa	95% LCL 1.0000 1.0000 1.0000 1.0000 1.0000	Passe DF 5 18 23 95% U 1.0000 1.0000 1.0000 1.0000 1.0000	CL	F Stat 65540 Median 1,0000 1,0000 1,0000 1,0000 1,0000	Min 1,0000 1,0000 1,0000 1,0000 1,0000	Max 1.000 1.000 1.000 1.000	00 00 00 00 00 00	Std Err 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	0.00% 0.00% 0.00% 0.00% 0.00% 0.00%	0.00% 0.00% 0.00% 0.00% 0.00% 0.00%
Control Resp ANOVA Table Source Between Error Total 48h Survival Conc-% 0 6.25 12.5 25 50 100 Angular (Corr Conc-% 0 6.25	Rate S	Sum Squa 0 0 0 ummary Code D	Count 4 4 4 4 4 Count	Mean 0 0 1.0000 1.0000 1.0000 1.0000 1.0000 1.0345 1.345	Squa	95% LCL 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0345 1.345	Passe DF 5 18 23 95% U 1.0000 1.0000 1.0000 1.0000 95% U	CL	Median 1.0000 1.0000 1.0000 1.0000 1.0000 Median	Min 1,0000 1,0000 1,0000 1,0000 1,0000 1,0000 Min 1,345 1,345	Max 1.000 1.000 1.000 1.000 Max 1.345 1.345	000 000 000 000 000 000	Std Err 0.0000 0.0000 0.0000 0.0000 0.0000 Std Err	0.00% 0.00% 0.00% 0.00% 0.00% 0.00%	0.00% 0.00% 0.00% 0.00% 0.00% 0.00% %Effect 0.00% 0.00%
Control Resp ANOVA Table Source Between Error Total 48h Survival Conc-% 0 6.25 12.5 25 50	Rate S	Sum Squa 0 0 0 ummary Code D	Count 4 4 4 4 4 Count	Mean 0 0 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0345	Squa	95% LCL 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	Passe DF 5 18 23 95% U 1.0000 1.0000 1.0000 1.0000 95% U 1.346	CL	Median 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	Min 1,0000 1,0000 1,0000 1,0000 1,0000 1,0000 Min 1,345	Max 1.000 1.000 1.000 1.000 Max 1.345	000 000 000 000 000 000	Std Err 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 Std Err 0	0.00% 0.00% 0.00% 0.00% 0.00% 0.00%	0.00% 0.00% 0.00% 0.00% 0.00% 0.00%
Control Resp ANOVA Table Source Between Error Total 48h Survival Conc-% 0 6.25 12.5 25 50 100 Angular (Corr Conc-% 0 6.25	Rate S	Sum Squa 0 0 0 ummary Code D	Count 4 4 4 4 Count Count 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Mean 0 0 1.0000 1.0000 1.0000 1.0000 1.0000 1.0345 1.345	Squa	95% LCL 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0345 1.345	Passe DF 5 18 23 95% U 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 95% U 1.346 1.346	CL	Median 1.0000 1.0000 1.0000 1.0000 1.0000 Median 1.345 1.345	Min 1,0000 1,0000 1,0000 1,0000 1,0000 1,0000 Min 1,345 1,345	Max 1.000 1.000 1.000 1.000 Max 1.345 1.345	000 000 000 000 000 000	Std Err 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 Std Err 0	0.00% 0.00% 0.00% 0.00% 0.00% 0.00%	0.00% 0.00% 0.00% 0.00% 0.00% 0.00% %Effect 0.00% 0.00%
Control Resp ANOVA Table Source Between Error Total 48h Survival Conc-% 0 6.25 12.5 25 50 100 Angular (Corr Conc-% 0 6.25 12.5	Rate S	Sum Squa 0 0 0 ummary Code D	Count 4 4 4 4 Count 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Mean 0 0 1.0000 1.0000 1.0000 1.0000 1.0000 1.345 1.345 1.345	Squa	95% LCL 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.345 1.345 1.345	Passe DF 5 18 23 95% U 1.0000 1.0000 1.0000 1.0000 1.0000 1.346 1.346 1.346	CL	Median 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.045 1.345 1.345 1.345	Min 1.0000 1.0000 1.0000 1.0000 1.0000 Min 1.345 1.345 1.345	Max 1.000 1.000 1.000 1.000 1.000 1.000 1.345 1.345 1.345	000 000 000 000 000 000	Std Err 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 Std Err 0 0	0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00%	0.00% 0.00% 0.00% 0.00% 0.00% 0.00% %Effect 0.00% 0.00%

Report Date: Test Code: 21 Apr-17 11:06 (p 2 of 2)

17-413 | 09-6938-3753

Ceriodaphnia	48-h Acu	ite Survival	Test
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New England Bioassay

Analysis ID:	15-0851-5314	Endpoint:	48h Survival Rate	CETIS Version:	CETISv1.9.2
Analyzed:	21 Apr-17 11:06	Analysis:	Nonparametric-Control vs Treatments	Official Results:	Yes

48h Survival	Rate	Detail
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Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1:0000
25		1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000
100		1,0000	1.0000	1.0000	1,0000

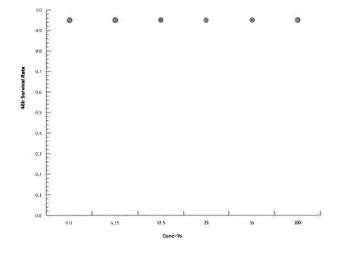
Angular (Corrected) Transformed Detail

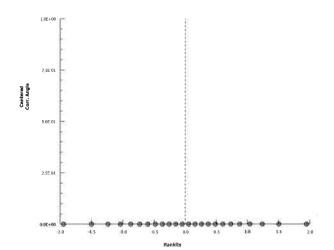
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.345	1.345	1.345	1.345
6.25		1.345	1.345	1.345	1.345
12.5		1.345	1.345	1.345	1.345
25		1.345	1.345	1.345	1.345
50		1,345	1.345	1.345	1.345
100		1,345	1,345	1.345	1,345

48h Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	5/5	5/5	5/5	5/5
6,25		5/5	5/5	5/5	5/5
12.5		5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5

Graphics





INITIAL CHEMISTRY INFORMATION

CLIENT: PROJECT #	05.0044476.00
RECIEPT DATE	3/28/17
SAMPLE	Effluent
COC#	КО
Temperature (°C)	4.1
Dissolved Oxygen (mg/L)	7.9
pH (standard units)	7.0
Conductivity (µmhos/cm)	1,487
Salinity (ppt)	<1
Hardness (as mg/L CaCO3)	104
Alkalinity (as mg/L CaCO3)	105
TRC - DPD (mg/L)	0.005
INITIALS	KO

Additional notes:		

ANALYTICAL RESULTS

Case No. D0327-30

<u>Parameter</u>	Effluent, mg/L	Det. Limit
Total Solids	664	10
Total Dissolved Solids	644	10
Total Suspended Solids	20	2
Ammonia (N)	15.4	0.1
Total Organic Carbon	8.70	1.0
TKN	25.74	0.1
Nitrate & Nitrite	2.38	0.007
Total Phosphorus	1.72	0.02
Hardness	135.6	0.33
<u>Parameter</u>	Effluent, mg/L	Det. Limit
Cadmium	0.0001	0.0001
Lead	0.0006	0.0002
Copper	0.011	0.003
Zinc	0.086	0.005
Nickel	0.003	0.001
Aluminum	0.159	0.013
Magnesium	5.16	0.013
Calcium	45.8	0.013
N.D.= Not Detected		

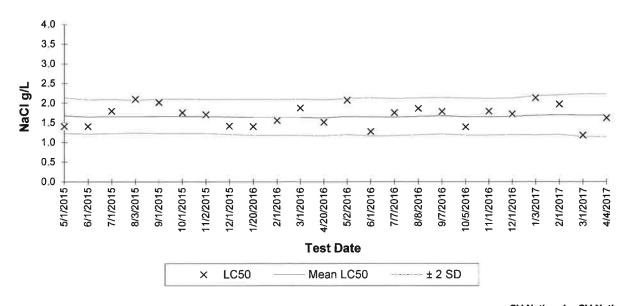
NEW ENGLAND BIOASSAY CHAIN-OF-CUSTODY

Sampler: JINTESC MCCDWAW Title: Chemist Facility: Lowell Regional Wastewater Utility Address: First Street Blvd. Route 110 Lowell, MA 01850	RECEIVING WATER Sampler: Title: Facility: Lowell Regional Wastewater Utility Address: First Street Blvd. Route 110 Lowell, MA 01850
Sar	mple Information
Collection Method: Grab Composite	037-1692
Sample ID:	
Start & End Dates: 3-27-2017 11=03A1	
Start & End Times:	
Type of Sample: WWTF Effluent Industrial Effluent Other	
Is the sample: Prechlorinated Dechlorinated Chlorine spiked in lab Unchlorinated	
Site Description:	
Sample Collection Procedures:	
	ample Shipment
	supre Surplient
Method of Shipment: UPS	
Relinquished By: But	Date: 3-22-// Time: //-43 Any
Received By: What he	Date: 3.27-17 Time: 11:40
Relinquished By:	Date:
Received By: Bun Noodon	Date: 3-27-17 Time: 7:30
	NEB USE ONLY
Temperature of Effluent Upon Receipt at Lab:°C	3-27-17 1615 ceived
Effluent COC#	received by (NGB): Crewto M 77 3/27/1997(615

IF THIS COOLER IS MISPLACED OR THE LABEL IS LOST, PLEASE SHIP TO: KIM WILLS, NEW ENGLAND BIOASSAY, 77 BATSON DRIVE, MANCHESTER CT 06042

New England Bioassay Reference Toxicant Data: Ceriodaphnia dubia 48-hour LC50

Reference Toxicant: Sodium chloride Testing Dates: May 2015 - April 2017



							-	CV National	CV National
Test II	D Date	LC ₅₀	Mean LC ₅₀	STD	-2 STD	+2 STD	CV	75th %	90th %
15-54	5 5/1/2015	1,4	1,7	0.2	1.2	2.1	0.14	0.29	0.34
15-70	0 6/1/2015	1.4	1.6	0.2	1.2	2.1	0.13	0.29	0.34
15-89	6 7/1/2015	1.8	1.7	0.2	1.2	2.1	0.13	0.29	0.34
15-107	78 8/3/2015	2.1	1.7	0.2	1.2	2.1	0.13	0.29	0.34
15-129	9/1/2015	2.0	1.7	0.2	1,2	2.1	0.13	0.29	0.34
15-145	3 10/1/2015	1.8	1.7	0.2	1.2	2.1	0.13	0.29	0.34
15-168	11/2/2015	1.7	1.7	0.2	1.2	2.1	0.13	0.29	0.34
15-177	2 12/1/2015	1.4	1.6	0.2	1.2	2.1	0.13	0.29	0.34
16-10	7 1/20/2016	1.4	1.6	0.2	1.2	2.1	0.14	0.29	0.34
16-13	4 2/1/2016	1.6	1.6	0.2	1.2	2.1	0.14	0.29	0.34
16-29	8 3/1/2016	1.9	1.6	0.2	1.2	2.1	0.14	0.29	0.34
16-56	3 4/20/2016	1.5	1.6	0.2	1,2	2.1	0.14	0.29	0.34
16-59	2 5/2/2016	2.1	1.7	0.2	1.2	2.1	0.14	0.29	0.34
16-70	3 6/1/2016	1.3	1.7	0.2	1.2	2.1	0.15	0.29	0.34
16-88	5 7/7/2016	1.8	1.6	0.2	1.2	2.1	0.14	0.29	0.34
16-115	6 8/8/2016	1.9	1.7	0.2	1.2	2.1	0.14	0.29	0.34
16-125	52 9/7/2016	1.8	1.7	0.2	1.2	2.1	0.14	0.29	0.34
16-146	66 10/5/2016	1.4	1.7	0.2	1.2	2.1	0.14	0.29	0.34
16-158	36 11/1/2016	1.8	1.7	0.2	1,2	2.1	0.14	0.29	0.34
16-173	30 12/1/2016	1.7	1.7	0.2	1.2	2.1	0.14	0.29	0.34
17-5	1/3/2017	2.1	1,7	0.2	1.2	2.2	0.15	0.29	0.34
17-14	7 2/1/2017	2.0	1.7	0.3	1.2	2.2	0.15	0.29	0.34
17-27	4 3/1/2017	1.2	1.7	0.3	1,2	2.2	0.16	0.29	0.34
17-47	5 4/4/2017	1.6	1.7	0.3	1,1	2.2	0.16	0.29	0.34



GEOTECHNICAL

ECOLOGICAL

200200101

WATER

CONSTRUCTION MANAGEMENT

77 Batson Drive Manchester, CT 06042 T: 860.643.9560 F: 860.646.7169



ACUTE AQUATIC TOXICITY TEST REPORT

Lowell Regional Wastewater Utilities Lowell, Massachusetts NPDES Permit: MA0100633

Test Start Date:	3/28/17			
Test Period:	March 2017			
Reno	ort Prepared by:			
Керс	of trepared by.			
New I	England Bioassay			
	ZA GeoEnvironmental, Inc.			
77	Batson Drive			
Mancl	hester, CT 06042			
NEB Project Number: 05.0044476.00				
Report Date:	April 21, 2017			
_				
Repo	ort Submitted to:			
New Englan	d Testing Laboratories			
	Greenhill Street			
	Varwick, RI02893			
Sample ID:	Stormwater			
oumpie in.	Stormwater			

Please contact the Lab Manager, Kim Wills, at (860) 858-3153 or kimberly.wills@gza.com if you have any questions concerning these results.

Whole Effluent Toxicity Testing Report Instruction Form

Client Name/Project: <u>NET/Lowell</u>	Test Date:	3/28/17
Sample ID: Stormwater		
Your results were as follows:		
Pass		
$\hfill\Box$ Fail – Please proceed according to the instructions i	in your permit.	
□ Invalid – Retesting is still required. Retest repor	t will be sent at a	a later date under separate cover.
□ Original Test Invalid – Valid retest performed. B	oth test and rete	st results are attached.
☐ Retesting will be or has been performed according of EPA-New England's species-specific, self-imple	•	
Protocols outlined in the attached copy of EPA policy for alternate dilution water. The alternate dishould be described as follows: "synthetic labora protocols, by adding specified amounts of salts into receiving water." Writing this letter should help you	a-New England's ilution water you atory water made o deionized water	species-specific, self-implementing select for future tests for this species up according to EPA's toxicity test in order to match the hardness of our
☐ Available information is insufficient to determine what to your permit limits. Please submit a current copy of the status of future tests results and help ensure your	of your permit to t	he NEB Lab so that we can determine

Please complete the items on this list before reporting these results according to the instructions in the "Monitoring and Reporting" Section of your permit.

- Please complete, sign and date the upper portion of the "Whole Effluent Toxicity Test Report Certification" page which is the page directly following this page.
- Fill in the Sample Type and Sample Method (upper right) and the Permit Limits (lower left) on the New England Bioassay, Inc.-EPA Toxicity Test Summary Sheet(s) if they are incomplete.
- Fill in any missing information on the NEB Chain-of-Custody documents. This includes ensuring
 that the following information is recorded: Sampler's name and title, Facility name and address,
 Sample collection methods, Sample collection start and end dates and times, Types of sample,
 Chlorination status of samples upon shipment to NEB, Site description and Sample collection
 procedures.
- Monitoring results should be summarized on your monthly Discharge Monitoring Report Form.
- Signed and dated originals of this report must be submitted to the State (and Federal) Agencies specified in the "Monitoring and Reporting" section of your permit.

Ouestions? Please contact the Lab Manager, Kim Wills, at (860) 643-9560 or kimberly.wills@gza.com.

WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION (Permittee)

I certify under penalty of law that this document and all ATTACHMENTS were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on		
	[Date]	[Authorized Signature]
		[Print or Type Name and Title]
		[Print or Type the Permittee's Name]
		[Print or Type the NPDES Permit No.]

Since the WET test and report check is complicated, the New England Bioassay Aquatic Toxicity Laboratory has certified the validity of the WET test data in the section below. Please note that this does not relieve the permittee from its responsibility to sign and certify the report under 40 C.F.R. S 122.41(k).

WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION (Bioassay Laboratory)

I certify under penalty of law that this document and all ATTACHMENTS were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on

[Date]

[Authorized Signature]

Kim Wills, Laboratory Manager

[Print or Type Name and Title]

New England Bioassay

[Print or Type Name of Bioassay Laboratory]

24. Telephone Contacts

If you have questions, please contact Joy Hilton, Water Technical Unit, at (617) 918-1877 or David McDonald, Ecosystem Assessment Unit, at (617) 918-8609.

NEW ENGLAND BIOASSAY, A DIVISION OF GZA EPA TEST SUMMARY SHEET

Facility Name: Lowe	ell RWWU		Test Start Date:	3/28/17
NPDES Permit Numb		633	Outfall Number:	
Test Type XAcute	Test Species Fathead Minno		ple Type echlorinated	Sample Method XGrab
	_	_		
Chronic	XCeriodaphnia	_	echlorinated	_ Composite
_ Modified	_ Daphnia Pulex		lorine Spiked in Lab	- Flowthru
(chronic reporting	_ Mysid Shrimp		lorinated on site	_ Other
acute values)	_ Sheepshead	Ut	nchlorinated	
_ 24hr screening	_ Menidia			
	_Sea Urchin			
	_ Champia			
	_ Selenastrum			
Dilution Water				
			ay from the discharge,	free from toxicity
	es of contamination			
			ss, etc. to generally ref	lect the
	s of the receiving wa)
			or equivalent deioniz	
reagent grade	chemicals; or deion	ized water con	abined with mineral wa	ater;
or artificial sea salts				
_ deionized water and	I hypersaline brine;	or		
_ other	-			
Effluent sampling date	e (s): 3/27/17			
Effluent concentration	s tested (in%): 0	<u>6.25</u> <u>12.5</u> <u>25</u>	<u>50</u> <u>100</u>	
* Permit limit	concentration: ≥	100%		
Was effluent salinity a	idjusted? No I	f yes, to what v	alue? N/A ppt	
With sea salts? N/A	Hypersaline brine	e solution? N	<u>/A</u>	
Actual effluent concer	ntrations tested after	salinity adjust	ment (%): <u>0</u> <u>6.25</u> <u>12</u>	<u>.5 25 50 100</u>
		•		
Reference Toxicant te	st date: 3/1/17		-	
	Test A	Acceptability C	riteria	
Mean Control Surviva	l: <u>N/A</u>	Mean C	Control Reproduction:	N/A
Mean Diluent Surviva	1: <u>100%</u>	Mean I	Diluent Reproduction:	N/A
Mean Control Weight	: <u>N/A</u>		Control Cell Count:	
Mean Diluent Weight	: N/A	Mean I	Diluent Cell Count:	N/A
_				
Limit	S		Results	
LC50 ≥ 100	% I	LC50	>100%	
		Jpper Value	±∞	
		Lower Value	100%	
		Data Analysis		
		Method Used	Graphical	
A-NOEC N/A		A-NOEC	100%	
C-NOEC N/A		C-NOEC		
O NOLC NA		LOEC		
IC25 N/A		C25		
		C50		
IC50 <u>N/A</u>	I'	C30		

CERIODAPHNIA DUBIA AQUATIC TOXICITY TEST REPORT EPA 821-R-02-012, "Methods for Measuring the Acute Toxicity of **Test Reference Manual:** Effluents and Receiving Waters to Freshwater Organisms and Marine Organisms", Fifth Edition **Test Method:** Ceriodaphnia dubia Acute Toxicity Test – Method 2002.0 Test Type: Acute Static Non-Renewal Freshwater Test 25 ± 1 °C Temperature: **Ambient Laboratory Illumination** Light Quality: 16 hours light, 8 hours dark Photoperiod: **Test Chamber Size:** 30 mL Minimum 25 mL **Test Solution Volume:** Age of Test Organisms: 1-24 hours (neonates) Number of Daphnids Per Test Chamber: 5 Number of Replicate Test **Chambers Per Treatment: 4 Total Number of Daphnids Per Test Concentration:** 20 Fed YCT and Selanastrum while holding prior to initiating test as Feeding Regime: per manual. **Aeration:** None NEB Lab Synthetic Soft Water (hardness 40 to 48 mg/L) **Dilution Water:** 0%, 6.25%, 12.5%, 25%, 50% and 100% effluent **Effluent Concentrations:** 48 hours **Test Duration:** Mortality – no movement of body/appendages on gentle prodding. **Effect measured:** Test Acceptability: \geq 90% survival of test organisms in control solution Yes X No _ Sampling Requirements: Samples first used within 36 hours of collection Yes X No Sample Volume Required: Minimum 1 liter

Mean Dilution Water Control Survival = ___100%__

Test Organism Source:

NEB

Test Acceptability Criteria: Mean Alternate Water Control Survival = N/A

<u> Γest Results:</u>		Limits	Results	Status			
	48-hour LC50 Upper Value Lower Value Data Analysis Method Use A-NOEC	≥ 100% ed	>100% ±∞ 100% Graphica 100%	Pass X Fail _			
Reference Toxicant Data:	Date: Toxicant: Dilution Water: Source: 48-hour LC50: In Acceptable Range	Sodiun NEB L New E	n Chloride ab Synthetic ngland Bioas gg/L No	say			
Dechlorination Procedures	: Chlorine is measured using	ng 4500 CL-C	G DPD Colori	imetric Method.			
X Dechlorination was not rec	quired						
Sample was dechlorinated by adding sodium thiosulfate to the sample prior to test initiation. Since dechlorination of the effluent was necessary, a thiosulfate control of diluent water spiked with sodium thiosulfate was also included in the test series. Chlorine was mg/L in a dechlorinated sample.							
Chlorine Measurement was filtered sample.	elevated due to interference	e. Chlorine v	vas	mg/L in a			
Total Residual Chlorine wa	24 20210 13 322 132 130 2		as found to be	e mg/L.			
Additional Notes or Other	Conditions Affecting the	lest:					
		=					

NEW ENGLAND BIOASSAY ACUTE TOXICITY DATA FORM COVER SHEET FOR LC50 TESTS

CLIENT:	New England Testing Laboratory		C.dubia TEST ID#	17-413
ADDRESS:	59 Greenhill Street		COC#	c37-1692
	West Warwick, RI 02893		PROJECT#	05.0044476.00
SAMPLE TYPE:	Lowell RWU Stormwater			
DILUTION WATER:	Soft Reconstituted Freshwater			
Sample Date(s):	3/27/17	Date Received:	3/27	7/17
	<u>11</u>	NVERTEBRATES		
	TEST SET UP (TECH INIT)	CW		
	TEST SPECIES	Ceriodaphnia dubia		
	NEB LOT#	Cd17(3-28)		
	AGE	< 24 hours		
	TEST SOLUTION VOLUME (mls)	30	•	
NO. OF	RGANISMS PER TEST CHAMBER	5		
	GANISMS PER CONCENTRATION	20		
	NO. ORGANISMS PER CONTROL	20		
LABORATORY CONTI	ROL WATER:		Hardness mg/L CaCO ₃	Alkalinity mg/L CaCO ₃
ARTIFICIA	AL FW: NEB BATCH #	C37-S005	48	30
	1,22 2	DATE	TIME	
	TEST START:	3/28/17	1205	
	TEST END:	3/30/17	1105	ā.
	RESULTS OF	Ceriodaphnia dubia	LC50 TEST	
			050/ G 51	
	METHOD	1.050 (0/)	95% Confidence	
	METHOD	LC50 (%)	Limits	
	Ì			ĺ
	BINOMIAL/GRAPHICAL	>100%	100%±∞	
	PROBIT			
	PROBIT			
	SPEARMAN KARBER			
	NOAEL	100%		
	1101 KAD	10070		ļ.
NOEC: NO OBSERV	ABLE EFFECT CONCENTRAT	ION		
Comments:				
-			1	
REVIEWD BY:		1/1	DATE:	4/2/17
				[1 . 1

NEW ENGLAND BIOASSAY Toxicity Test Data Sheet

NEB Test #:	17-413	Test Organism:	Ceriod	Ceriodaphnia dubia		
Project #:	05.0044476.00	Organism Age:	< 24 hours			
Facility Name:	Lowell RWU Stormwater	Test Duration:	48	(hours)		
Date Sampled:	3/27/17	Beginning Date:	3/28/17	Time:	1205	
Date Received:	3/27/17	Dilution Water So	ource:	SRCF		
Sample ID:	Stormwater	Dilution Hardness:	48	ppm as	CaCO ₃	

Effluent Conc. %	,	lumber o Survivinç Organism	3		Dissolved Oxygen (mg/L)	ı	Te	emperatu (°C)	ire		рН	
Initials	CW	СВ	KO	CW	СВ	KO	CW	СВ	KO	CW	СВ	ко
	0	24	48	0	24	48	0	24	48	0	24	48
Diluent A	5	5	5	7.1	8.1	8.5	24.6	25.5	24.0	7.2	7.6	7.5
Diluent B	5	5	5			8.5			24.2			7.5
Diluent C	5	5	5			8.4			24.3			7.6
Diluent D	5	5	5			8.4			24.5			7.6
6.25 A	5	5	5	7.1	7.9	8.4	24.3	25.7	24.5	7.4	7.5	7.5
6.25 B	5	5	5			8.4			24.5			7.6
6.25 C	5	5	5			8.4			24.6			7.6
6.25 D	5	5	5			8.3			24.6			7.6
12.5 A	5	5	5	7.1	7.8	8.3	24.2	25.6	24.6	7.5	7.6	7.6
12.5 B	5	5	5			8.3			24.6			7.6
12.5 C	5	5	5			8.3			24.7			7.7
12.5 D	5	5	5			8.2			24.8			7.7
25 A	5	5	5	7.1	7.6	8.2	24.5	25.7	24.8	7.6	7.6	7.7
25 B	5	5	5			8.2			24.7			7.7
25 C	5	5	5			8.1			24.7			7.7
25 D	5	5	5			8.1			24.7			7.8
50 A	5	5	5	6.9	7.1	8.1	24.4	25.8	24.7	7.5	7.7	7.8
50 B	5	5	5			7.9			24.7			7.8
50 C	5	5	5			7.9			24.7			7.8
50 D	5	5	5			7.9			24.7			7.9

LC50	Confidence Interval	A-NOEC	Computational Method
>100%	100%±∞	100%	Graphical

NEW ENGLAND BIOASSAY Toxicity Test Data Sheet

NEB Test #:	17-413	Test Organism: Ceriodaphnia dub		laphnia dubia	r
Project #:	05.0044476.00	Organism Age:	< 24 hours		
Facility Name:	Lowell RWU Stormwater	Test Duration:	48	(hours)	
Date Sampled:	3/27/17	Beginning Date:	3/28/17	Time:	1205
Date Received:	3/27/17	Dilution Water So	urce:	SRCF	
Sample ID:	Stormwater	Dilution Hardness:	48	ppm as C	CaCO ₃

Effluent Conc. %		lumber o Survivino Organism	g	Dissolved Oxygen (mg/L)		Temperature (°C)			рН			
Initials	CW	СВ	KO	CW	СВ	KO	CW	СВ	КО	CW	СВ	ко
WAR DO DE	0	24	48	0	24	48	0	24	48	0	24	48
100 A	5	5	5	6.9	6.3	7.7	24.5	25.8	24.6	7.5	7.8	7.9
100 B	5	5	5			7.5			24.7			7.9
100 C	5	5	5			7.5			24.7			7.9
100 D	5	5	5			7.5			24.7			8.0

LC50	Confidence Interval	A-NOEC	Computational Method
>100%	100%±∞	100%	Graphical

21 Apr-17 11:06 (p 1 of 2)

Report Date: Test Code: 17-413 | 09-6938-3753 Ceriodaphnia 48-h Acute Survival Test New England Bioassay

ocitodapinia	40-11 Addit Odi VIVa			Now England Blocost		
Analysis ID: Analyzed:	12-7868-6810 21 Apr-17 11:06	Endpoint: Analysis:	48h Survival Rate Linear Interpolation (ICPIN)	CETIS Vers Official Re		CETISv1.9.2 Yes
Batch ID:	11-9877-1193	Test Type:	Survival (48h)	Analyst:		
Start Date:	28 Mar-17 12:05	Protocol:	EPA/821/R-02-012 (2002)	Diluent:	Laboi	ratory Water
Ending Date:	30 Mar-17 11:05	Species:	Ceriodaphnia dubia	Brine:	Not A	pplicable
Duration:	47h	Source:	In-House Culture	Age:	<24h	
Sample ID:	11-2351-3758	Code:	42F7759E	Client:	New	England Testing Labs
Sample Date:	27 Mar-17 11:00	Material:	WWTF Effluent	Project:		
Receipt Date:	27 Mar-17 16:15	Source:	Lowell RWWU (MA0100633)			
Sample Age:	25h	Station:				

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X)	Linear	938231	200	Yes	Two-Point Interpolation
Test Acceptabi	lity Criteria	TAC Limits			

Attribute	Test Stat	Lower	Upper	
Control Resp	1	0.9	>>	

•	Decision

Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	1	0.9	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL	
LC50	>100	n/a	n/a	<1	n/a	n/a	

48h Survival Rate Summary		Calculated Variate(A/B)									
Conc-%	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	Α	В
0	D	4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	20	20
6.25		4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	20	20
12,5		4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	20	20
25		4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	20	20
50		4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	20	20
100		4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	20	20

48h Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000

48h Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	5/5	5/5	5/5	5/5
6.25		5/5	5/5	5/5	5/5
12.5		5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5

Report Date:

21 Apr-17 11:06 (p 2 of 2)

Test Code:

17-413 | 09-6938-3753

Ceriodaphnia 48-h Acute Survival Test

New England Bioassay

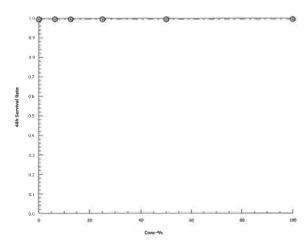
Analysis ID: Analyzed: 12-7868-6810 21 Apr-17 11:06 Endpoint: 48h Survival Rate

Analysis: Linear Interpolation (ICPIN)

CETIS Version: Official Results: Y

CETISv1.9.2 : Yes

Graphics



Report Date: Test Code:

21 Apr-17 11:06 (p 1 of 2)

17-413 | 09-6938-3753

Ceriodaphnia 48-h Acute Survival Test **New England Bioassay** CETISv1.9.2 15-0851-5314 48h Survival Rate **CETIS Version:** Analysis ID: Endpoint: Analyzed: 21 Apr-17 11:06 Analysis: Nonparametric-Control vs Treatments Official Results: Yes Batch ID: 11-9877-1193 Survival (48h) Test Type: Analyst: Laboratory Water Start Date: 28 Mar-17 12:05 Protocol: EPA/821/R-02-012 (2002) Diluent: Brine: Not Applicable Ending Date: 30 Mar-17 11:05 Species: Ceriodaphnia dubia **Duration:** In-House Culture <24h 47h Source: Age: Sample ID: 11-2351-3758 42F7759E Client: New England Testing Labs Code: **WWTF Effluent** Project: Sample Date: 27 Mar-17 11:00 Material: Receipt Date: 27 Mar-17 16:15 Lowell RWWU (MA0100633) Source: Sample Age: 25h Station: **Data Transform** NOEL LOEL TOEL TU Alt Hyp C > T 100 > 100 Angular (Corrected) n/a Steel Many-One Rank Sum Test Critical DF P-Type P-Value Decision(a:5%) Control Conc-% Test Stat Ties **Dilution Water** 6.25 18 10 1 6 Asymp 0.8333 Non-Significant Effect 12.5 18 10 1 6 Asymp 0.8333 Non-Significant Effect 25 18 10 6 0.8333 Non-Significant Effect 1 Asymp 50 0.8333 Non-Significant Effect 18 10 1 6 Asymp 100 18 10 6 0.8333 Non-Significant Effect 1 Asymp **Test Acceptability Criteria TAC Limits** Attribute Overlap Decision Test Stat Lower Upper Control Resp 0.9 >> Yes Passes Criteria **ANOVA Table** DF Source **Sum Squares** Mean Square F Stat P-Value Decision(a:5%) Between 0 5 65540 <1.0E-37 Significant Effect 0 Error 0 18 0 Total 23 48h Survival Rate Summary Conc-% Code Count Mean 95% LCL 95% UCL Median Min Max Std Err CV% %Effect 0 D 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 0.00% 0.00% 4 1.0000 6.25 4 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 0.00% 0.00% 12.5 4 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 0.00% 0.00% 25 4 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 0.00% 0.00% 0.00% 50 4 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 0.00% 100 4 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 0.00% 0.00% Angular (Corrected) Transformed Summary Code Count 95% UCL Median Min Max Std Err CV% %Effect Conc-% Mean 95% LCL 1.345 1.345 1.346 1.345 1.345 1.345 0 0.00% 0.00% 6.25 4 1.345 1.345 1.346 1.345 1.345 1.345 0 0.00% 0.00% 4 1.345 1.346 1.345 1.345 1 345 0 0.00% 0.00% 12.5 1.345 25 4 1.345 1.345 1.346 1.345 1.345 1.345 0 0.00% 0.00% 50 4 1.345 1.345 1.346 1.345 1.345 1.345 0 0.00% 0.00% 1.345 1.345 1.346 1.345 1.345 1.345 0 0.00% 0.00% 100

Report Date: Test Code: 21 Apr-17 11:06 (p 2 of 2)

17-413 | 09-6938-3753

Ceriodaphnia 48-h Acute Survival Test

New England Bioassay

Analysis ID:	15-0851-5314	Endpoint:	48h Survival Rate	CETIS Version:	CETISv1.9.2
Analyzed:	21 Apr-17 11:06	Analysis:	Nonparametric-Control vs Treatments	Official Results:	Yes

48h Su	ırvival	Rate	Detail
--------	---------	------	--------

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1,0000

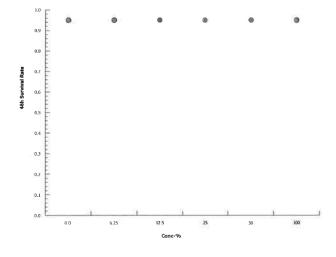
Angular (Corrected) Transformed Detail

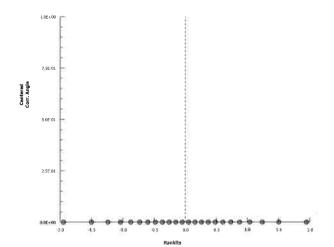
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.345	1.345	1.345	1.345
6.25		1.345	1.345	1.345	1.345
12.5		1.345	1.345	1.345	1.345
25		1.345	1.345	1.345	1.345
50		1.345	1.345	1.345	1.345
100		1,345	1,345	1.345	1.345

48h Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	5/5	5/5	5/5	5/5
6,25		5/5	5/5	5/5	5/5
12.5		5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5

Graphics





INITIAL CHEMISTRY INFORMATION

CLIENT: PROJECT #	Lowell Stormwater 05.0044476.00
RECIEPT DATE	3/28/17
SAMPLE	Effluent
COC#	КО
Temperature (°C)	4.1
Dissolved Oxygen (mg/L)	7.9
pH (standard units)	7.0
Conductivity (µmhos/cm)	1,487
Salinity (ppt)	<1
Hardness (as mg/L CaCO3)	104
Alkalinity (as mg/L CaCO3)	105
TRC - DPD (mg/L)	0.005
INITIALS	KO
Additional notes:	

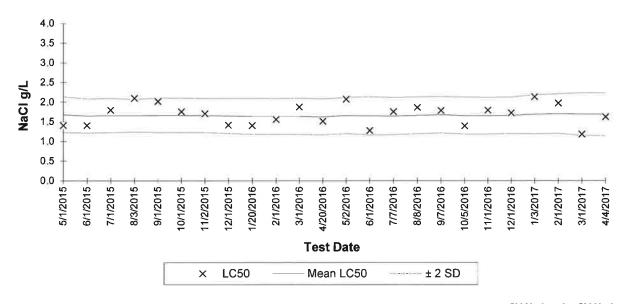
NEW ENGLAND BIOASSAY CHAIN-OF-CUSTODY

Sampler: DIN BOK MCCD WAW Title: Clients Facility: Lowell Regional Wastewater Utility Address: First Street Blvd. Route 110 Lowell, MA 01850	RECEIVING WATER Sampler: Title: Facility: Lowell Regional Wastewater Utility Address: First Street Blvd. Route 110 Lowell, MA 01850
San	nple Information
Collection Method: Grab Composite	037-1692
Sample ID:	
Start & End Dates: 3-27-2017 11503A	J
Start & End Times:	
Type of Sample: WWTF Effluent Industrial Effluent Other	
Is the sample: Prechlorinated Dechlorinated Chlorine spiked in lab Unchlorinated	
Site Description:	
Sample Collection Procedures:	
SERVICE WHILE AND THE SERVICE SANDERS SANDERS	imple Shipment
	imple ompinent
Method of Shipment: UPS	
Relinquished By: Bu	Date: 3-22-17 Time: //-40 Any
Received By: What Kla	Date: 3.27-17 Time: 11:40
Relinquished By:	Date: 3-27-17 Time: 1430
Received By: Bur Noodon	Date: 3-27-17 Time: 7:30
	NEB USE ONLY
Temperature of Effluent Upon Receipt at Lab: <u>°C</u>	3-27-17 1615 awed
Effluent COC#	received by (NGB). Cleast m 27 3/27/1900/615

IF THIS COOLER IS MISPLACED OR THE LABEL IS LOST, PLEASE SHIP TO: KIM WILLS, NEW ENGLAND BIOASSAY, 77 BATSON DRIVE, MANCHESTER CT 06042

New England Bioassay Reference Toxicant Data: Ceriodaphnia dubia 48-hour LC50

Reference Toxicant: Sodium chloride Testing Dates: May 2015 - April 2017



								CV National	CV National
Test ID	Date	LC ₅₀	Mean LC ₅₀	STD	-2 STD	+2 STD	CV	75th %	90th %
15-545	5/1/2015	1,4	1,7	0.2	1.2	2.1	0.14	0.29	0.34
15-700	6/1/2015	1.4	1.6	0.2	1.2	2.1	0.13	0.29	0.34
15-896	7/1/2015	1.8	1.7	0.2	1.2	2.1	0.13	0.29	0.34
15-1078	8/3/2015	2.1	1.7	0.2	1.2	2.1	0.13	0.29	0.34
15-1293	9/1/2015	2.0	1.7	0.2	1,2	2.1	0.13	0.29	0.34
15-1453	10/1/2015	1.8	1.7	0.2	1.2	2.1	0.13	0.29	0.34
15-1684	11/2/2015	1.7	1.7	0.2	1.2	2.1	0.13	0.29	0.34
15-1772	12/1/2015	1.4	1.6	0.2	1.2	2.1	0.13	0.29	0.34
16-107	1/20/2016	1.4	1.6	0.2	1.2	2.1	0.14	0.29	0.34
16-134	2/1/2016	1.6	1.6	0.2	1.2	2.1	0.14	0.29	0.34
16-298	3/1/2016	1.9	1.6	0.2	1.2	2.1	0.14	0.29	0.34
16-563	4/20/2016	1.5	1.6	0.2	1.2	2.1	0.14	0.29	0.34
16-592	5/2/2016	2.1	1.7	0.2	1.2	2.1	0.14	0.29	0.34
16-703	6/1/2016	1.3	1.7	0.2	1.2	2.1	0.15	0.29	0.34
16-885	7/7/2016	1.8	1.6	0.2	1.2	2.1	0.14	0.29	0.34
16-1156	8/8/2016	1.9	1.7	0.2	1.2	2.1	0.14	0.29	0.34
16-1252	9/7/2016	1.8	1.7	0.2	1.2	2.1	0.14	0.29	0.34
16-1466	10/5/2016	1.4	1.7	0.2	1.2	2.1	0.14	0.29	0.34
16-1586	11/1/2016	1.8	1.7	0.2	1,2	2.1	0.14	0.29	0.34
16-1730	12/1/2016	1.7	1.7	0.2	1.2	2.1	0.14	0.29	0.34
17-5	1/3/2017	2.1	1,7	0.2	1.2	2.2	0.15	0.29	0.34
17-147	2/1/2017	2.0	1.7	0.3	1.2	2.2	0.15	0.29	0.34
17-274	3/1/2017	1.2	1.7	0.3	1,2	2.2	0.16	0.29	0.34
17-475	4/4/2017	1.6	1.7	0.3	1,1	2.2	0.16	0.29	0.34